PETROGRAPHY AND MINERAL CHEMISTRY OF THE PIPLIYA EUCRITE. P.C. Buchanan[1,2], S.H. Coetzee[3], W.U. Reimold[1], and A.M. Reid[4]. [1]Dept. of Geology, Univ. of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa. [2]Inst. of Geochemistry, Univ. of Vienna, Althanstrasse 14, A-1090 Vienna, Austria. [3]Electron Microscope Unit, Univ. of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa. [4]Dept. of Geosciences, Univ. of Houston, Houston, Texas.

SUMMARY. The Pipliya meteorite is a brecciated eucrite predominantly composed of lithic clasts with subordinate matrix. Lithic clasts represent two lithologies: A and B [1]. Lithology A is fine-grained and contains pyroxenes similar in composition to those in 'main group' eucrites. Lithology B is similar in mineralogy to lithology A, but is medium-grained.

INTRODUCTION. The Pipliya meteorite fell on 20 June, 1996 in Pipliya Kalan village, Pali, Rajasthan, west India [1]. Vaya et al. [1] report that two stones covered with fusion crusts weighed 20 kg and 10 kg, respectively, and formed two small craters. The meteorite is an achondritic breccia predominantly composed of lithic clasts in a subordinate, fine-grained matrix. Lithic clasts have been reported to represent two lithologies which have been denoted A and B [1]. In hand specimen, both lithologies have an ophitic/subophitic texture. Lithology A is fine-grained and is composed of white feldspar laths and pinkish grey pyroxenes, while lithology B is coarser-grained than lithology A and is composed of white feldspar laths and greenish grey pyroxenes.

RESULTS. The matrix of the Pipliya meteorite makes up a relatively minor portion of the volume of the meteorite. It is fine-grained (average grain size <<0.5mm) and apparently has little porosity. Texture of the matrix is similar to matrices in some howardites and polymict eucrites which were exposed to metamorphic processes [e.g., 2]. However, no examples were noted of Fe-Ni metal with 'spongy' textures as were observed in the polymict eucrite Petersburg [2,3]. Hewins [3] interpreted the textures of these Fe-Ni metal aggregates as the result of minor metamorphism after final aggregation of the Petersburg breccia.

Lithology A is composed of 65% pyroxene, 25% plagioclase, 6% opaques, and 4% xenolithic components [1]. No mesostasis is apparent. Texture is fine-grained (average grain size is <1mm). Feldspars are twinned, are lath-like with length:width ratios which approach 15, and do not display any prefered orientations. Pyroxenes commonly are anhedral, are unzoned, and are composed of augite exsolution lamellae in a low-Ca pyroxene host. Representative compositions (Fig. 1) are similar to those of 'main group' eucrites (e.g., Juvinas) [4]; compositions form a trend which stretches from the composition of the augite lamellae to that of the low-Ca pyroxene host and is the result of the inability of the electron beam to resolve thin exsolution lamellae. Both feldspars and pyroxenes contain abundant inclusions.

Lithology B is composed of 55% pyroxene, 40% plagioclase, and 5% opaques [1]. Texture is medium-grained (average

grain size is ~1mm). No mesostasis is apparent. Feldspars are twinned, are lath-shaped to blocky with length:width ratios which approach ~7, and contain abundant inclusions which in some cases are rod-like and commonly occur along prefered crystallographic planes. In some areas of lithology B feldspars display twin lamellae that are kinked and offset by fractures indicating shock deformation [1]. Pyroxenes are elongated to equant and are composed of thick augite exsolution lamellae (up to 10 microns in width) in a low-Ca pyroxene host. Twinning of these pyroxenes is also apparent [1]. Pyroxene compositions (Fig. 1) are similar in Mg# to those of lithology A and to those of 'main group' eucrites [4].

DISCUSSION AND CONCLUSIONS. Texture and mineralogy suggest that the Pipliya meteorite is a brecciated eucrite. The meteorite is distinctive because of its high proportion of lithic clasts as compared to the amount of brecciated matrix and because lithology A and lithology B are similar in mineralogy of pyroxenes, but are different in texture and grain size. Texture of matrix material suggests that the breccia may have undergone late stage metamorphism.

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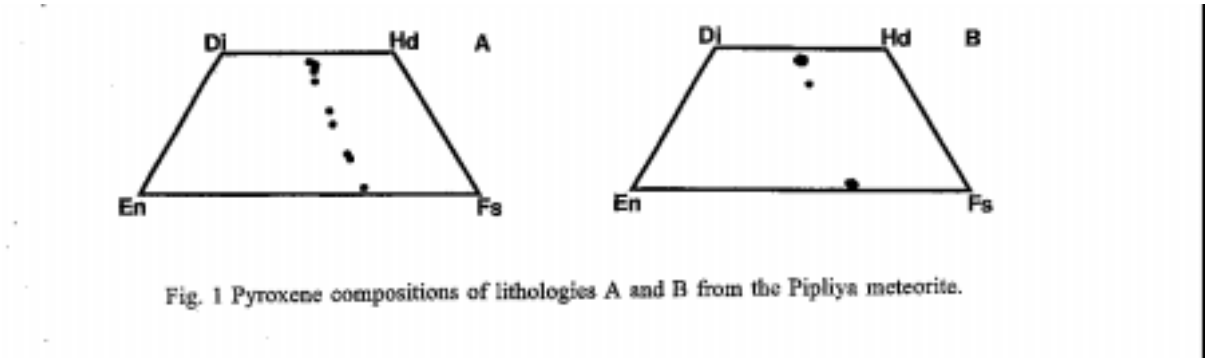

Fig. 1 Pyroxene compositions of lithologies A and B from the Pipliya meteorite.